

What is claimed is:

1. A method for reading a radiation image from a stimulable phosphor sheet comprising a transparent substrate and a stimulable phosphor layer containing therein a latent radiation image by means of a radiation image-reading means comprising a stimulating light-applying unit and a stimulated emission-collecting unit comprising a lens and a stimulated emission-receiving plane, which 5 comprises the steps of applying a stimulating light onto the stimulable phosphor layer under the condition that the stimulable phosphor sheet moves along a sheet plane thereof in relation to the stimulated emission-collecting unit; collecting a stimulated emission emitting from the 10 area onto which the stimulating light is applied on the stimulated emission-receiving plane through the transparent substrate and lens; and photoelectrically converting the collected emission into electric signals in the stimulated emission-collecting unit, wherein the stimulable 15 phosphor sheet moves in relation to the stimulated emission-collecting unit under the condition that the stimulating light-applied area of the stimulable phosphor layer is kept apart from the center of the stimulated emission-receiving plane with a space in the range defined by a combination of a reference space and a focal 20 depth of the lens, the reference space being defined by a length at which the stimulated emission emitting from the stimulable phosphor layer focuses on the stimulated emission-receiving plane after passing through the transparent 25 substrate and lens.

2. The method of claim 1, wherein the stimulable phosphor sheet has a reference plane area on both side surfaces of the transparent substrate on the side of the 30 stimulable phosphor layer and the stimulable phosphor sheet is moved under the condition that the phosphor

sheet is supported at the reference plane areas on a supporting means which is arranged in a position fixed in relation to the stimulated emission-collecting unit.

5       3. The method of claim 1, wherein the stimulable phosphor sheet has a reference plane area on both side surfaces of the transparent substrate on the side of the stimulable phosphor layer, the stimulable phosphor sheet is supported at the reference plane areas on a supporting 10 means, and the stimulated emission-collecting unit is moved on the supporting means.

15       4. The method of claim 2, wherein the reference plane area of the transparent substrate has on a surface thereof irregularities within  $\pm 100 \mu\text{m}$  in terms of a mean irregularity height.

20       5. The method of claim 1, wherein the transparent substrate is a rigid transparent substrate.

6. The method of claim 5, wherein the rigid transparent substrate is a glass sheet.

25       7. The method of claim 1, wherein the stimulable phosphor layer has a stimulated emission-reflecting layer on the side not facing the substrate.

30       8. The method of claim 1, wherein the stimulable phosphor layer is produced by a gas phase deposition method.

35       9. The method of claim 1, wherein the stimulating light-applying unit and stimulated emission-collecting unit of the radiation image-reading means are arranged on the side facing the transparent substrate of the stimulable phosphor sheet.

10. A radiation image reading apparatus for performing the method of claim 2, which comprises the radiation image-reading means, the supporting means which is  
5 arranged in a position fixed in relation to the radiation image-reading means and allows movement of the stimulable phosphor sheet along the sheet plane by supporting the stimulable phosphor sheet at the reference plane areas, and a driving means for driving the movement of the  
10 stimulable phosphor sheet.

11. A radiation image reading apparatus for performing the method of claim 3, which comprises the radiation image-reading means, the supporting means which is  
15 arranged in a position fixed in relation to the stimulable phosphor sheet and allows movement of the radiation image-reading means, and a driving means for driving the movement of the radiation image-reading means.

20 12. A method for reading a radiation image from a stimulable phosphor sheet comprising a substrate and a stimulable phosphor layer containing therein a latent radiation image by means of a radiation image-reading means comprising a stimulating light-applying unit and a  
25 stimulated emission-collecting unit comprising a lens and a stimulated emission-receiving plane, which comprises the steps of applying a stimulating light onto the stimulable phosphor layer under the condition that the stimulable phosphor sheet moves along a sheet plane  
30 thereof in relation to the stimulated emission-collecting unit; collecting a stimulated emission emitting from the area onto which the stimulating light is applied on the stimulated emission-receiving plane through not the substrate but the lens; and photoelectrically converting the  
35 collected emission into electric signals in the stimulated emission-collecting unit, wherein the stimulable phos-

phor sheet moves in relation to the stimulated emission-collecting unit under the condition that the stimulating light-applied area of the stimulable phosphor layer is kept apart from the center of the stimulated emission-  
5 receiving plane with a space in the range defined by a combination of a reference space and a focal depth of the lens, the reference space being defined by a length at which the stimulated emission emitting from the stimulable phosphor layer focuses on the stimulated emission-  
10 receiving plane after passing through the lens.

13. The method of claim 12, wherein the stimulable phosphor sheet has a reference plane area on both side surfaces of the substrate on the side of the stimulable phosphor layer and the stimulable phosphor sheet is moved under the condition that the phosphor sheet is supported at the reference plane areas on a supporting means which is arranged in a position fixed in relation to the stimulated emission-collecting unit.  
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20 14. The method of claim 12, wherein the stimulable phosphor sheet has a reference plane area on both side surfaces of the substrate on the side of the stimulable phosphor layer, the stimulable phosphor sheet is supported on a supporting means, and the stimulated emission-collecting unit is moved on the reference plane areas of the stimulable phosphor sheet.  
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30 15. The method of claim 14, wherein the stimulable phosphor sheet has on a surface of the stimulable phosphor layer irregularities within  $\pm 50 \mu\text{m}$  in terms of a mean irregularity height.

35 16. The method of claim 12, wherein the substrate is a rigid substrate.

17. The method of claim 16, wherein the rigid substrate is made of material having a modulus of elasticity of  $1 \times 10^5$  kgf/cm<sup>2</sup> or higher and a thickness in the range of 200  $\mu$ m to 10 mm.

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18. The method of claim 12, wherein the stimulable phosphor layer is produced by a gas phase deposition method.

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19. The method of claim 12, wherein the stimulating light-applying unit and stimulated emission-collecting unit of the radiation image-reading means are arranged on the side facing the stimulable phosphor layer of the stimulable phosphor sheet.

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20. A radiation image reading apparatus for performing the method of claim 13, which comprises the radiation image-reading means, the supporting means which is arranged in a position fixed in relation to the radiation image-reading means and allows movement of the stimulable phosphor sheet along the sheet plane by supporting the stimulable phosphor sheet at the reference plane areas, and a driving means for driving the movement of the stimulable phosphor sheet.

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30. A radiation image reading apparatus for performing the method of claim 14, which comprises the radiation image-reading means, the supporting means which is arranged in a position fixed in relation to the stimulable phosphor sheet, and a driving means for driving the movement of the radiation image-reading means on the reference plane areas of the stimulable phosphor sheet.

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22. A stimulable phosphor sheet comprising a rigid substrate, a stimulable phosphor layer having irregularities on a surface thereof, and a reference plane-forming

guide means attached to the rigid substrate on both side surfaces thereof, the reference plane-forming means having a surface of irregularity identical to those of the surface of the stimulable phosphor layer.

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23. The stimulable phosphor sheet of claim 22, wherein the stimulable phosphor layer has a curved, deformed or sloping surface thereon, and the reference plane-forming guide means having a surface identical to the surface of the stimulable phosphor layer

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24. The stimulable phosphor sheet of claim 23, wherein the stimulable phosphor layer is produced by a gas phase deposition method.

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